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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,874	02/07/2005	Jong-In Lee	YOU-13002/00	2465
25006	7590	01/25/2006	EXAMINER	
GIFFORD, KRASS, GROH, SPRINKLE & CITKOWSKI, P.C			PARSA, JAFAR F	
PO BOX 7021			ART UNIT	
TROY, MI 48007-7021			PAPER NUMBER	

1621

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/523,874	Applicant(s) LEE ET AL.	
	Examiner Jafar Parsa	Art Unit 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/21/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Machida et al (USPN 6,268,528).

Machida teaches a method of producing naphthalenedicarboxylic acid, which comprises the steps of (1) oxidizing dialkylnaphthalene to naphthalenedicarboxylic acid at 160 to 240⁰ C in a solvent containing a lower aliphatic carboxylic acid using a molecular oxygen-containing gas in the presence of a catalyst comprising a cobalt compound, a manganese compound and a bromine compound to obtain a oxidation product mixture, and (2) subjecting the oxidation product mixture to a solid-liquid separation to obtain crystals of naphthalenedicarboxylic acid and a mother liquor when a concentration of naphthalenedicarboxylic acid in the oxidation product mixture is 8 to 30% by weight, an atomic ratio of manganese to cobalt of the catalyst being 0.03 to 0.5, and the catalyst being supplied to an oxidation reaction zone so that a total of cobalt and manganese is 0.025 to 0.1 gram atom based on 1 gram atom of the dialkylnaphthalene (see col. 3, lines 33-58). The starting dialkylnaphthalene used in this process includes dimethylnaphthalene and lower aliphatic acid used as the solvent is acetic acid (see col. 3, lines 57-67). A source of the molecular oxygen-containing gas

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include oxygen gas, and a mixed gas of oxygen and an inert gas such as nitrogen and argon and air is most usually used (see col. 5, lines 34-37 and Example 1). Machida teaches that the starting solution was continuously supplied to the reactor over one hour while adjusting the flow rate of air so as to achieve about 2 volume % oxygen in the vent gas stream. After the starting solution was supplied entirely, the supply of air was continued until achieving about 10 volume % oxygen in the vent gas stream (see Example 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Machida et al (USPN 6,268,528).

The present invention relates to a method for the preparation of naphthalene dicarboxylic acid by oxidizing dimethylnaphthalene with oxygen in air in the presence of

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acetic acid solvent using the metal catalysts of cobalt and manganese, and bromine, wherein the temperature of said oxidation reaction is 155 to 180°C and in the presence of a gas selected from the group of nitrogen gas, off-gas and mixture thereof into an upper portion of a reactor to yield a naphthalene dicarboxylic acid.

Machida teaches a method of producing naphthalenedicarboxylic acid, which comprises the steps of (1) oxidizing dialkylnaphthalene to naphthalenedicarboxylic acid at 160 to 240° C in a solvent containing a lower aliphatic carboxylic acid using a molecular oxygen-containing gas in the presence of a catalyst comprising a cobalt compound, a manganese compound and a bromine compound to obtain a oxidation product mixture, and (2) subjecting the oxidation product mixture to a solid-liquid separation to obtain crystals of naphthalenedicarboxylic acid and a mother liquor when a concentration of naphthalenedicarboxylic acid in the oxidation product mixture is 8 to 30% by weight, an atomic ratio of manganese to cobalt of the catalyst being 0.03 to 0.5, and the catalyst being supplied to an oxidation reaction zone so that a total of cobalt and manganese is 0.025 to 0.1 gram atom based on 1 gram atom of the dialkylnaphthalene (see col. 3, lines 33-58). The starting dialkylnaphthalene used in this process includes dimethylnaphthalene and lower aliphatic acid used as the solvent is acetic acid (see col. 3, lines 57-67). A source of the molecular oxygen-containing gas include oxygen gas, and a mixed gas of oxygen and an inert gas such as nitrogen and argon and air is most usually used (see col. 5, lines 34-37 and Example 1). Machida teaches that the starting solution was continuously supplied to the reactor over one hour while adjusting the flow rate of air so as to achieve about 2 volume % oxygen in the vent

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gas stream. After the starting solution was supplied entirely, the supply of air was continued until achieving about 10 volume % oxygen in the vent gas stream (see Example 1).

The instant claims require that a gas selected from nitrogen gas, off-gas or a mixture thereof is fed into the upper portion of the reactor. Machida is silent regarding the position where nitrogen gas is fed to the reactor. However, it is well within the level of one ordinary skill in the art to feed the nitrogen gas into the reactor from either upper or the lower portion of the reactor with the expectation of achieving maximum yield of naphthalene dicarboxylic acid.

Dependent claim 7 requires that the weight ratio of air to dimethylnaphthalene is 4:1 to 15:1. Machida is silent regarding the ratio of the air to dimethylnaphthalene. However, it is well within the purview of one ordinary skill in the art to optimize the ratio of the air to dimethylnaphthalene in order to maximize the yield of the naphthalene dicarboxylic acid (98.2% yield, see Table 1b).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jafar Parsa whose telephone number is (571)272-0643. The examiner can normally be reached on 8 a.m.-4:30 p.m. (M-F).

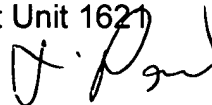
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on (571)272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JP
January 17, 2006

Jafar Parsa
Primary Examiner
Art Unit 1621



J. PARSA
PRIMARY EXAMINER